

that time. It is indeed curious the path which research may take, and perhaps it is these queer turns and quirks that make it fun to try to follow the pathway.

Although this particular path of homocystine researches appeared to have no connection with insulin, a recent turn of events has brought the two fields back together again and serves as an interesting example of how offshoots of a research may wander away and bend back again, touch, and even aid the original research. I refer here to the recent work on the question of whether or not a trace of methionine is present in crystalline insulin, and to the fact that one of the methods for determining methionine depends on the determination of the homocysteine thiolactone formed from methionine by hydriodic acid. I shall refer to this again later.

Along with attempts to fractionate insulin hydrolysates to see if a strange sulfur compound were present, and testing for the presence or absence of known sulfur-containing compounds such as thiohistidine, we have also studied the question of the completeness of hydrolysis of insulin and the prevention of destruction of the cystine during hydrolysis.

To make a very long story short, after trying various procedures, we finally found that if we hydrolyzed insulin with twenty per cent hydrochloric acid and 50 per cent formic acid we were able to account by the Sullivan method for all of the sulfur as cystine within the experimental error of the method. We were able, furthermore, to adduce evidence that the previous low results were really due to a destruction of the cystine on the one hand and incomplete hydrolysis on the other.

Whether or not a trace of methionine is present cannot be stated definitely. Our own results on the study would indicate that if it is present at all it is even less than that reported by Brand. You can readily understand the difficulty of proving the presence or absence of a very slight trace of methionine in dealing with such a compound as insulin. One is dealing with such small amounts that one is at the borderline of the accuracy of the methods. Much more work will be needed before reaching a final decision.

Another aspect of the sulfur of insulin that has intrigued us, which even more forcibly brings out the importance of the sulfur, is the effect of reduction upon the activity of insulin. Earlier work had shown that various reducing agents destroyed the activity, but the reagents used were quite vigorous ones and one would have reason to believe that groupings other than the disulfide may have been re-

duced. We thought it would be rather interesting to study the effect of such mild reducing agents as cysteine and glutathione, which were more specific for the disulfide grouping. Even with such subtle reducing agents as these the insulin became inactivated. From much experimentation we finally came to the conclusion that the reduction of the disulfide grouping was the cause of the inactivation. It is interesting that reoxidation did not restore the activity. These results have been confirmed and extended by other workers, and it has been found that the rate of inactivation proceeds faster than that of reduction. This has led some to conclude that there are certain groupings particularly sensitive to reduction and that one or two disulfide linkages have a special function in insulin.

Our own tendency is to regard the architecture of the molecule as a whole as the important factor with regard to its hypoglycemic action and that any change which would produce a change in this architecture is apt to produce a destruction of physiological activity. From this standpoint no one particular disulfide linkage is necessarily more important than another as far as being responsible for the activity. The rupture of a given disulfide linkage might modify the architecture sufficiently to destroy its ability to bring about the oxidation of carbohydrates. Although the disulfide linkage *per se* may not be responsible for the insulin action, I should like to emphasize the fact that so far no one has split out or changed the disulfide grouping without destroying potency.

I would like to add, parenthetically, that there are some who speak in terms of a prosthetic grouping being present in insulin, that is, the presence of some smaller grouping attached to the protein molecule which is responsible for the activity; while there are others who like to speak of a nucleus of certain amino acids responsible for the activity as an integral part of the protein molecule. I should like to emphasize that at the present time these are assumptions. Of course, I do not mean to intimate that these things can not be so. There simply is no evidence for them as yet and one should recognize these views for the assumptions that they are. No criticism can be leveled, of course, at anyone for using them as working hypotheses.

In summing up what we actually know of the chemistry of insulin, we might say that all the evidence points towards the fact that insulin is a protein. But we must admit that from the standpoint of actual chemical structure we know very little about it, even though we probably know more about the chemistry of this protein than of any other. In fact, it is one of the most thoroughly studied proteins.

In judging what is known of the chemistry of insulin one should compare it, not with certain of the other hormones such as adrenalin or thyroxin, but rather with what is known of other crystalline proteins.

In closing I should like to call to your attention the role that insulin has played in bringing the field to the realization that a protein may have hormonal properties, or should I say, that a hormone could actually be a protein.

We almost forget now the strong prejudice that existed at the time of the isolation of crystalline insulin, that the crystalline material could not be the hormone because it was, to all intents and purposes, a protein. Yet as the work progressed the conclusion began to take form that insulin was truly a protein-like substance. The actual isolation of various amino acids from the compound, the study of the nitrogen distribution, the studies on the heat precipitation, the crystallization by various methods, and many other studies all pointed inevitably in this direction. As time went on the idea of a hormone being a protein became less objectionable to the field as a whole, and the possibility that other hormones might be proteins became plausible. This was true of the parathyroid hormone which controls calcium metabolism and the hormones of the pituitary gland—both the anterior and the posterior lobes. Of course, these latter hormones that I have just mentioned have defied isolation as yet, and we must withhold final judgment until they have been isolated, but the available evidence indicates that they are polypeptide or protein-like compounds.

This realization that a hormone could be a protein has been hastened by the recognition of other physiologically active substances which have also appeared to be proteins or protein-like substances. Within the past few years we have had the isolation of a number of enzymes starting with the isolation of urease in crystalline form by Sumner and culminating in the isolation of certain proteolytic enzymes, such as pepsin and trypsin, in crystalline form by Northrop. All of these crystalline enzymes appear to be proteins and present chemical problems quite analogous to insulin. The crystalline plant virus recently isolated by Stanley also appears to be a protein. Furthermore, it seems that toxins, antitoxins, antigens and antibodies and the like are proteins. We have, therefore, a growing list of compounds possessing remarkable physiological action, all of which appear to be proteins.

The studies that have been carried out on insulin become, therefore, of more fundamental value because of their possible significance to the study of these other crystalline physiologically active proteins. It should also be apparent from what I have just said about this entire group of substances that one of the greatest needs of biochemistry today is an understanding of protein structure itself.

PALEONTOLOGY.—*Clithrocrinus*, new name for *Clistocrinus* Kirk.¹
EDWIN KIRK, U. S. Geological Survey.

In this JOURNAL² I described a new genus to which I gave the name *Clistocrinus*. My attention has been called to the fact that Springer³ had erected the genus *Cleistocrinus*. Incidentally, this latter name had previously appeared in print in error for *Cleioocrinus* Billings.⁴

Springer in describing the genus gave the Greek words from which he derived the name. They are the same as used by me. According to classical usage with these words as given, the generic name could be written *Clestocrinus* or *Clistocrinus*, with preference given the latter by the International Rules of Zoological Nomenclature. There is also a variant spelling in the Greek that would give *Clestocrinus* directly. *Cleistocrinus* is an improper transliteration of the words as given. However, there is an Ionic variant of the Greek that would give this spelling. It thus appears that properly transliterated *Clestocrinus*, *Cleistocrinus*, and *Clistocrinus* could all be derived from the Greek and with the same meaning. Pronunciation would vary with the nationality of the speaker.

There seems to be nothing in the Code clearly prohibiting the use of more than one of the variant spellings given above, although naturally their use should be discouraged. There is, however, owing to opinions handed down by the Commission, some doubt as to whether *Clistocrinus* Kirk is a homonym of *Cleistocrinus* Springer. In order to clarify the meaning of the Code and obtain a ruling from the Commission, I am proposing a new generic name to supplant *Clistocrinus*. I propose the name *Clithrocrinus*, with *C. pyriformis* (Kirk) as genotype. The genus and species thus stands as *Clithrocrinus pyriformis* (Kirk).

The doubtful status of *Clistocrinus* primarily rests on the incom-

¹ Published by permission of the Director, U. S. Geological Survey. Received July 21, 1937.

² This JOURNAL 27: 106. 1937.

³ SPRINGER, FRANK. *The Crinoidea Flexibilia*. Smithsonian Inst. Pub. 2501, 1930.

⁴ LUDWIG, H. Zool. Jahresber. for 1905, *Echinoderma*, pp. 4, 8, 1906.

patibility of Articles 8 and 19 of the Code. It may be held under Article 19 of the International Rules that *Cleistocrinus* is an error of transcription (*seu* transliteration) or a *lapsus calami* and should be changed to *Clistocrinus*. On the other hand, under Article 8 *k* and *l* words formed by an arbitrary combination of letters, or names formed by anagram, are held to be in good standing. If such be the case, rigid adherence to classical orthography and transliteration in isolated cases would seem to be hypercritical. After all, an improperly transliterated word may legitimately be considered an arbitrary combination of letters and would fall under Article 8 *k*. In a somewhat similar case (Opinion 26) nearly a hundred years after publication the Commission changed the spelling of a generic name on the somewhat easy assumption that a typographical error was involved. In the present instance one could as well assume that the typographical error or *lapsus calami* lay in the printing of the Greek word and that Springer really intended to use *Cleistocrinus*.

BOTANY.—*Eleven new Asteraceae from North and South America.*¹
S. F. BLAKE, Bureau of Plant Industry.

This paper contains descriptions of eleven new species of Asteraceae (two from the United States, four from Mexico, five from South America), as well as two new varieties and several new names and combinations.

***Bipontia* Blake, nom. nov.**

Soaresia Sch. Bip. *Pollichia* 20–21: 376. 1863. Not *Soaresia* Allem. Rev. Braz. 1: 210. *pl.* 1857, and Arch. Palestr. Sci. Rio de Janeiro 1: 142. *pl.* 1858 (1859?).

Argyrophyllum Pohl, ex parte; Baker in Mart. Fl. Bras. 6²: 150. 1873, as syn.

***Bipontia velutina* (Sch. Bip.) Blake.**

Soaresia velutina Sch. Bip. *Pollichia* 20–21: 377. 1863.

Argyrophyllum ovali-ellipticum Pohl; Baker in Mart. Fl. Bras. 6²: 150. 1873, as syn.

In selecting a new name for this rare Brazilian monotype of the tribe Vernoniae I have sought to commemorate the work of Karl Heinrich Schultz (1805–1867), its original describer, one of the most active and enthusiastic students of Compositae of the last century, who was known as Schultz Bipontinus (from Zweibrücken, his birthplace) to distinguish him from a homonymous botanist of Berlin as well as from other botanists of the same family name. The fuller and preferable form, *Bipontinia*, is not

¹ Received June 23, 1937.

available for use, having been employed by Alefeld (1866) for a segregate from *Psoralea* now generally regarded as a synonym of that genus. The name *Bipontina* was published by Schultz² himself, but only as a section of *Matricaria*, and has never appeared in generic rank. Pohl's herbarium name *Argyrophyllum*, known only from its use in synonymy by Baker, deserves only to be passed over. It was employed by Pohl, according to Baker's synonymy, for two quite unrelated species, *Vernonia venosissima* Sch. Bip. (*Argyrophyllum lanceolato-ellipticum* Pohl; Baker, l. c. 30, a name omitted from Index Kewensis) and *Soaresia velutina* (*A. ovali-ellipticum* Pohl). The name *Argyrophyllum* is omitted from Engler & Prantl's *Natürlichen Pflanzenfamilien* and from Dalla Torre & Harms' *Genera Siphonogamarum*.

The earlier genus *Soaresia* Allemão is now referred to *Clarisia* R. & P. (Moraceae). The genus and its single species *Soaresia nitida* were published by Allamão (Archivos de Palestra Scientifica do Rio de Janeiro 1: 142. 1858 [1859?]) with a combined generic-specific description, which is valid publication according to the International Rules as revised in 1930. I have not seen the supposedly earlier publication of the same names in the *Revista Brasileira*, but it has been checked for me by Dr. L. R. Abrams in the Stanford University Library, and from his notes it would appear that the same text and plate that were published in the Archivos were published also in the *Revista*. The date of publication of both papers of Allemão is somewhat uncertain, but in any case is several years earlier than Schultz's use of the same name. In the Index Londinensis the date 1854 is assigned to Allemão's plate published in the Archivos, but this is merely the author's date at the close of his paper, which follows immediately another paper dated 1856. The title page date of the volume is 1858, but the Library of Congress copy bears in pencil the date 1859.

This change of name, obligatory under the International Rules, will cause little inconvenience, as the plant concerned is apparently very rare and has probably not been referred to in botanical literature more than half a dozen times. It is figured by Baker in the *Flora Brasiliensis* (6²: pl. 38).

Alomia stenolepis Blake, sp. nov.

Herba, caule tenui glandulari-pilosulo et sparse longius piloso; folia opposita remota ovata acuminata basi subcordata dupliciter crenato-serrata utrinque viridia sparse pilosa et brevius glandulari-pilosa, petiolis aequilongis tenuibus glandulari-pilosis; capitula 105-flora per 3-8 in apicibus pedunculorum terminalium et e axillis superioribus orientium folia superantium subdense cymosa, pedicellis 3-6 mm longis; involucri paullum gradati 3-4-seriati 4 mm alti phyllaria angustissime linearia subsetaceo-acuminata parum pilosa et glandulari-pilosa; receptaculum nudum; achenia glanduloso-adsersa 1.4 mm longa.

"In a clump 0.6 m high and as broad"; stem with weak branches above, terete, striatulate, greenish, about 2 mm thick above, rather densely pilosulous

² Ueber die Tanac. 26. 1844.

with spreading white hairs about 0.1–0.3 mm long, tipped with purplish glands, and, especially above, more sparsely pilose with many-celled eglandular hairs about 0.7 mm long; uppermost internode 15–17 cm long; leaves opposite, or the uppermost alternate but approximate; petioles very slender, unmarginated, purplish, glandular-pubescent like the stem, 3–5.5 cm long; blades ovate, 5–6 cm long, 3.5–4.7 cm wide, acuminate, at base subtruncate or shallowly cordate and often slightly inequilateral, thin, 3–5-nerved from the very base (the veins prominulous, the veinlets scarcely so), simply or usually doubly crenate-serrate essentially to the base (the teeth about 12–20 pairs, 1.5–3 mm high, obtusely callous-mucronulate), above sparsely short-pilose on veins and surface with several-celled mostly eglandular hairs, glabrescent, beneath equally green, on the veins pilose and with a few shorter hairs tipped with purplish glands, on the surface thinly short-pilose with many of the hairs tipped with pale yellow glands, or the latter often subsessile; peduncles terminal and in the uppermost axils, 3–5 per stem, pubescent like the stem, naked or with a single leaf-like bract, 5–10.5 cm long, very slender, bearing 3–8 heads; heads (as pressed) 5–6 mm high, 5 mm thick, hemispheric; involucre 3–4-seriate, slightly graduate, the phyllaries all similar, very narrowly linear (0.2–0.3 mm wide), rather firm, greenish with purplish tips, 2-ribbed, sparsely pilose and glandular-pubescent much like the stem; corollas very slender, deep purple above, subsessile-glandular below and on the teeth, otherwise glabrous, 3–3.3 mm long (tube 0.8–1 mm, throat scarcely distinguishable from tube, 2 mm, teeth ovate, obtusish, about 0.3 mm long); achenes 5-angled, sessile-glandular chiefly above, 1.4 mm long, blackish-brown, with short whitish crustaceous base and terminal whitish collar, epappose; styles (dried) white.

Mexico: On rocks at water's edge, in Lower Sonoran zone, Canyon Guadalupe, Sierra Chiribo, Rio Mayo, Sonora, 11 March 1935, *Howard S. Gentry* 1434 (type no. 766039, Field Mus.; photog. and fragm., U. S. Nat. Herb.).

In characters of involucre and corolla, this species seems somewhat intermediate between the subgenera *Geissanthodium* and *Eualomia* as distinguished by Robinson. The corollas, as in the first group, are not differentiated into tube and throat, and the phyllaries are 3–4-seriate. They are, however, firm and only 2-ribbed, and the species, on the whole, seems best referred to *Eualomia*. It is readily distinguished by its foliage, its pubescence, and especially by its very narrow phyllaries.

***Chrysothamnus nauseosus* var. *psilocarpus* Blake, var. nov.**

Rami arcte flavescenti-viridi-tomentosi vix striati; folia anguste linearia 4–5.5 cm longa 1.5–2.5 mm lata acuminata plana 1–nervia lutescenti-viridia subglabra v. tenuiter laxeque pilosula; capitula cymoso-paniculata, paniculis planiusculis 3–5 cm latis; involucri gradati 3-seriati (seriebus perpendiculatis sat distinctis) 8.5–10 mm alti phyllaria exteriora lanceolata acuminata interiora lineari-lanceolata acuta (ca. 1.3 mm lata) omnia praecipue ad apicem ciliata dorso glabra vittato-carinata; corollae 10 mm longae (dentibus ovatis 1–1.2 mm longis inclusis) in tubo et basi faucis sparse puberulae pilis clavellatis; achenia glaberrima 5 mm longa; styli ramorum appendices (2.2 mm longae) parte stigmatifera (1.5–1.6 mm longa) sesqui longiores.

Utah: Huntington Canyon, Emery Co., 21 July 1935, *A. O. Garrett* 7021 (type no. 1,679, 641, U. S. Nat. Herb.); also 7048, same data.

In Hall & Clements' monograph of *Chrysothamnus*³ this plant keys out to *C. nauseosus* ssp. *leiospermus* (A. Gray) Hall & Clements.⁴ In that plant the leaves are filiform or nearly so, the involucre only 6–8 mm high, the corolla 5–8 mm long, and its lobes only about 0.5 mm long. From the two other forms of *C. nauseosus* with glabrous achenes, *C. nauseosus* var. *glareosus* (Jones) Hall and var. *bigelovii* (A. Gray) Hall, var. *psilocarpus* differs in its merely ciliate, not dorsally tomentose phyllaries. Var. *glareosus* differs also in its obtuse phyllaries, var. *bigelovii* in its nearly or quite filiform leaves.

APHANOSTEPHUS PINULENSIS Coulter, Bot. Gaz. 16: 98. 1891.

The type or type collection of this species, *J. D. Smith* 2407, from Pinula, Dept. Guatemala, Guatemala, alt. 1340 meters, came to the U. S. National Herbarium in the John Donnell Smith collection. It proves to be *Chrysanthemum parthenium* (L.) Bernh., a frequent escape from cultivation in Central America and Mexico.

Aster coahuilensis Blake, sp. nov.

Perennis bipedalis ubique (involucris exceptis) pilosus viridescens; folia inferiora ovata majuscula obtusa basi alte cordata papyracea grosse crenata longe petiolata, petiolis parum marginatis; folia media multo minora ovata acuminata crenato-serrata petiolis laminam semiaequantibus late marginatis prope basin saepe ampliatis; capitula vix numerosa (ca. 14–25 per caulem) mediocria corymboso-paniculata, bracteis ramealibus parvis linearibus v. subulatis; involucri turbinato-hemisphaerici 7 mm alti 4–5-seriati gradati phyllaria subappressa lineari-lanceolata acuta v. acuminata infra (circiter ad medium) indurata albida 1-sulcata supra herbacea (apice herbaceo anguste rhombico-lanceolato) sparse ciliolata ceterum glabra, exteriora calloso-apiculata; radii (sicc.) pallide violacea ca. 19 ca. 8 mm longa; achenia hispidula.

Herb 57 cm high, the stem (in the single specimen examined) bifurcate near the base, otherwise essentially simple below the inflorescence, green, subterete, not densely spreading-pilose with white hairs, eglandular; leaves rather crowded toward base of stem, the petioles of these leaves broad, flat, very narrowly or not at all margined, 6–10 cm long, 2–3 mm wide, widened and submembranaceous at base, rather densely spreading- or deflexed-pilose, the blades ovate, 8–11 cm long, 4.5–6.7 cm wide, very obtuse, rather deeply cordate (sinus 3–10 mm deep), coarsely crenate nearly throughout (the teeth about 10–15 pairs, very blunt, about 1 mm high, mostly 5–10 mm apart), feather-veined (chief veins 2–3 pairs), above rather

³ Phylog. Meth. Taxon. 210. 1923.

⁴ *Chrysothamnus nauseosus* var. *abbreviatus* (Jones) Blake.—*Bigelovia leiosperma* A. Gray, Syn. Fl. 1²: 139. 1884. *Aster leiospermus* Kuntze, Rev. Gen. 1: 318. 1891. *Chrysothamnus leiospermus* Greene, Erythea 3: 113. 1895. *Bigelovia leiosperma* var. *abbreviata* Jones, Proc. Calif. Acad. 11. 5: 693. 1895. *Chrysothamnus nauseosus* var. *leiospermus* Hall, Univ. Calif. Publ. Bot. 7: 173. 1919. *Chrysothamnus nauseosus* [ssp.] *leiospermus* Hall & Clements, Phylog. Meth. Taxon. 217. 1923.—Jones's var. *abbreviata* is merely an insignificant form or condition of *leiospermus*, and his name, as the earliest published in the varietal category, must be adopted when the plant is treated as a variety.

light green, evenly but not densely spreading-pilose with several-celled hairs obscurely enlarged at base, soft or in age roughish to the touch, beneath rather lighter green, evenly but not densely pilose on surface with spreading hairs, densely so along costa; middle leaves not numerous, longer than the internodes, pubescent like the lower leaves, the blades ovate or lance-ovate, 4–6 cm long, about 2.2 cm wide, acute or acuminate, rounded at base, crenate-serrate mostly near middle with 3–7 pairs of teeth, the petioles 2–3.5 cm long, 2–5 mm wide; upper leaves (subtending the lower branches of the inflorescence) lanceolate, acuminate, narrowed at base, sessile, entire or nearly so, 3–5 cm long, 5–9 mm wide; inflorescence occupying about $\frac{1}{3}$ the height of the plant, corymbiform-paniculate, rather few-headed, about 13–18 cm long, 8–10 cm wide, the branches divergent-erectish, not densely short-spreading-pilose all around or more or less in lines, the primary branches mostly 2–5-headed, not in the least racemiform, the ultimate pedicels mostly 5–22 mm long, mostly with a few small subulate or linear bracts above; phyllaries 0.5–0.8 mm wide, the green tips somewhat thickened; heads about 2.2 cm wide; disk about 9 mm high, 6–8 mm thick (as pressed); rays about 19, the tube sparsely pilose above, 2.5 mm long, the lamina linear, 2–3-denticulate, 4-nerved, about 8 mm long, 1.8 mm wide; disk corollas essentially glabrous, soon purplish above, 7 mm long (tube 2.2 mm, throat 4 mm, teeth triangular-ovate, acutish, 0.8 mm long); achenes (immature) oblong, subcompressed, hispidulous, 5-nerved, 1.8–2.2 mm long; pappus rather copious, brownish white, 6.5 mm long.

Mexico: Moist wooded canyon on the eastern slope of the Sierra de San Manuel, Municipio de Musquiz, Coahuila, 30 June 1936, *F. Lyle Wynd & C. H. Mueller* 372 (type no. 1,638,865, U. S. Nat. Herb.).

Allied to *Aster drummondii* Lindl., but apparently specifically distinct in its longer pubescence, its merely crenate lower leaves, and particularly in its relatively few-headed and open corymbiform panicle with the heads conspicuously pedicellate and not at all racemosely arranged. The inflorescence, in fact, is more like that of the average *Aster laevis* than that of *A. drummondii*.

Aster intricatus (A. Gray) Blake.

Linosyris ? *carcosa* A. Gray, Pl. Wright. 2: 80. 1853.

Aster carnosus A. Gray; Hemsl. Biol. Centr. Amer. Bot. 2: 120. 1881. Not *A. carnosus* Gilib. 1781.

Bigelovia carcosa Benth. & Hook.; Hemsl. Biol. Centr. Amer. Bot. 2: 120. 1881, as synonym.

Bigelovia intricata A. Gray, Proc. Amer. Acad. 17: 208. 1882.

Linosyris carcosa Greene, Fl. Franc. 384. 1897.

The well known name of this very characteristic plant, *Aster carnosus*, must be changed, owing to the existence of an earlier homonym in *Aster carnosus* Gilib.⁵ The latter is merely an illegitimate name, published with a description and with *Aster tripolium* L. cited as a synonym, but nevertheless, according to Art. 61 of the International Rules of Botanical Nomenclature (1930) precludes the use of the same name for a later described species. The species was redescribed as *Bigelovia intricata* by Gray in 1882, and this

⁵ Fl. Lit. 1: 214. 1781.

specific name must be taken up for it. I am indebted to Dr. F. W. Pennell for a transcript of Gilibert's description from the copy of his work in the library of the Philadelphia Academy.

Aster horridus (Woot. & Standl.) Blake.

Herrickia horrida Woot. & Standl. Contr. U. S. Nat. Herb. 16: 186. pl. 50. 1913.

Although this species, the type and sole member of the genus *Herrickia* Wooton & Standley, is not readily placed in any of the sections into which the genus *Aster* is divisible, it is certainly not worthy of generic separation. Its closest relationship, especially evident in the involucre, is apparently with *Aster wasatchensis* (Jones) Blake, a member of the group often separated under the generic name *Eucephalus* Nutt. *Aster wasatchensis* itself is anomalous in its group by reason of its herbaceous-tipped phyllaries, and could not be run down to *Eucephalus* by the generic key given in Rydberg's "Flora of the Rocky Mountains and adjacent plains."

Erigeron allocotus Blake, sp. nov.

Perennis caespitosus spithamaeus ubique patenti-hispidus et minute glanduloso-hispidulus subcinerascens; caules decumbentes paene e basi ramosi foliosi, ramis divergenti-erectiusculis; folia cuneata v. spatulata 3-5-fida v. 3-partita, lamina in petiolum multo longiorem sensim angustata, segmentis oblongo-ovatis v. lanceolatis v. linearibus obtusis v. acutis, folia superiora minora linearia v. lineari-spatulata integra v. 3-fida; capitula parva radiata apicibus ramorum et ramulorum solitaria longe pedunculata; involucri ca. 4-seriati parum gradati 4.5 mm alti phyllaria acuta v. breviter acuminata extima lineari-lanceolata herbacea interiora oblonga latiuscule subscarioso-marginata medio viridia; radii ca. 22-26 breves "albi" (sicc. pallide lavendulacei v. rosei); discus luteus; achenea compressa 2-nervia hispidula; pappus simplex fragilis.

Leafy-stemmed herb 13-18 cm high, many-stemmed from a slender, branched, apparently oblique caudex, the bases of the stems of the year covered with the imbricated marcescent bases of petioles, the whole plant moderately densely hispid with wide-spreading many-celled acuminate white hairs up to 1.5 mm long and also finely glandular-hispidulous; stems slender, subterete or subangulate; leaves (except the reduced upper ones) longer than the internodes, those toward base of stem crowded but not at all rosulate; lower leaves 1.7-3 (-4) cm long including petiole, light green, rather thick, the blade (about 4-8 mm long, 3-5 mm wide) 3-5-fid for about half its length or sometimes parted essentially to base, the segments mostly oblong or ovate-oblong, 1-6 mm long, 0.7-2.5 mm wide, acute or obtuse, entire or the lateral sometimes 2-lobed; middle stem leaves similar but more often deeply parted, sometimes with linear lobes; upper leaves much smaller, mostly 4-8 mm long, entire or 2-3-toothed or -fid; peduncles (naked tips of branches) mostly 3-4.5 cm long; involucre hemispheric, appressed, the outermost phyllaries herbaceous essentially throughout, 0.4-0.5 mm wide, spreading-hispid and glandular-hispidulous, the inmost about 0.8 mm wide, similarly pubescent on the green midline, this about equaling in breadth the subscarios whitish margin; heads 1-1.2 cm wide; disk 5 mm high, 6-8 mm thick (as pressed); rays about 6-7 mm long, the tube pilose above, 1.5 mm

long, the lamina narrowly elliptic, subentire or 2-denticulate, 3-5-nerved, 4.3-5.3 mm long, 1.5 mm wide; disk flowers numerous, their corollas sparsely hispidulous on base of throat, papillose-crested on the teeth, 2.7 mm long (tube 0.5 mm, throat subcylindric, 1.8 mm, teeth ovate, 0.4 mm); achenes obovate, compressed, 2.3 mm long, 0.7 mm wide, nerved on the margin, appressed-hispidulous, whitish; pappus strictly simple, of about 22 fragile hispidulous white bristles 2.2-2.5 mm long, readily detergent, leaving a minute toothed crown.

Wyoming: Dry rocky hillside, near Grouse Creek, Shell Creek Canyon, Big Horn Co., Township 53 N., Range 89 W., alt. 2285 m, 8 July 1936, *Louis O. & Rua Williams* 3283 (type no. 1,684,047, U. S. Nat. Herb.).

The 3-5-fid or -parted leaves of this plant would seem to place it in the group of *Erigeron compositus*, but it differs from the several known members of that group in its freely branched leafy stems bearing rather numerous heads, as well as in details of foliage and pubescence.

Erigeron trihecatactis Blake, sp. nov.

Annuus erectus subvalidus infra inflorescentiam simplex dense foliosus ubique dense stipitato-glandulosus in caule patenti-pilosus; folia uniformia anguste oblonga v. oblanceolata obtusa apiculata sessilia amplectentia grosse serrata lutescenti-viridia ca. 5 cm longa 1 cm lata; capitula ca. 10 cymoso-paniculata mediocria brevissime radiata; involucri ca. 4-seriati paullum gradati 6.5 mm alti phyllaria lineari-lanceolata acuminata tenuia anguste pallideque marginata; radii numerosissimi 5-6-seriati albi non exserti, lamina suberecta ca. 1 mm longa elliptica; flores disci 31 flavi; achenia 2-nervia hispidula; pappus albidus simplex corollam subaequans.

Stem rather stout, subterete, inconspicuously striate, about 65 cm high, 4 mm thick at base, yellowish green, brownish green above, densely stipitate-glandular and more sparsely pilose with slender few-celled white hairs about 1 mm long; internodes about 1 cm long; leaves mostly with fascicles in their axils, the lower deflexed, the upper erectish; blades below the middle of stem somewhat smaller than the others, about 3.5-4 cm long, 5-8 mm wide, similar to the upper in shape and cutting; middle and upper leaves 4-5.8 cm long, 9-11 mm wide, shallowly cordate-amplexicaul at the not narrowed base, not decurrent, firm, plane or very narrowly revolute on margin, coarsely serrate except toward base (teeth about 4-6 pairs, obtuse, apiculate, 1-2 mm high, 5-10 mm apart), densely stipitate-glandular and (chiefly along margin) more or less pilose, feather-veined, the veins prominulous and loosely reticulate beneath; inflorescence rounded, about 8 cm long, 6 cm wide, the heads 1-4 at tips of the few branches, the principal bracts similar to the leaves but much smaller, the pedicels 3-22 mm long, pubescent like the stem, naked or with 1 or 2 subulate bracts; heads hemispheric, 1-1.4 cm wide (as pressed), 6 mm high; involucre densely stipitate-glandular and very sparsely pilose, inconspicuously graduated, the phyllaries erect, yellowish green with narrow yellowish white subscarios margin and tip, 0.6-1 mm wide; receptacle broad, flat, alveolate especially toward the center, the margins of the alveolae toothed; rays 333 (in 1 head), fertile, the tube 2.5-3 mm long, very sparsely puberulous with several-celled blunt slightly clavellate hairs, the lamina elliptic, emarginate, 1-3-nerved, 1-1.3 mm long, about 0.3 mm wide; disk flowers 31, fertile, their corollas yellow, puberulous above the middle like the ray corollas, 3.7 mm long (tube 1.4 mm, throat

cylindric-funnelform, 1.6 mm, teeth 5, ovate, 0.7 mm long); achenes obovate-oblong, 0.8–1 mm long, 0.4 mm wide, nerved on the margin, whitish; pappus sparse, of about 17 hispidulous bristles about 3.8 mm long; style branches with deltoid-ovate obtuse papillose appendages.

Colombia: "Ad ripam rivi et in paramos," Chapinero, near Bogotá, on road to Usaquén, Dept. Cundinamarca, 12 Sept. 1926, *S. Juzepczuk* 6724 (type, Herb. Leningrad; photo. and fragm., U. S. Nat. Herb.); same locality, 28 May 1926, *Juzepczuk* 5015 (Herb. Leningrad).

This strongly marked species is a member of the Section *Caenotus*, and seems to be very distinct from any described species.

***Clibadium glabrescens* Blake, sp. nov.**

Frutex; rami et ramuli glabri v. subglabri; folia ovata acuminata basi cuneata tenuiter petiolata serrata utrinque viridia tripli- vel quintuplinervia supra scabriuscula subtus sparse strigillosa; capitula mediocria mox remotiuscula subsessilia; phyllaria 4 late ovata v. suborbicularia obtusa saepius 9–11-nervia; receptaculum ubique paleaceum; flor. fem. 5–6, hermaph. 9–11; ovaria flor. fem. apice dense pilosa.

"Slender shrub, 4–6 ft."; branches slender, subterete, striatulate, 2–2.5 mm thick, olive-green, glabrous; branchlets glabrous or very sparsely strigillose; internodes 2–10 cm long; petioles very slender, unmarginated, 2–2.5 cm long, sulcate above, strigillose in the sulcus, otherwise glabrous; blades 8–11 cm long, 4–5 cm wide, caudate-acuminate, acutely cuneate at base, serrate or serrulate from about the middle of the cuneate lower part to below the tip (teeth about 19–22 pairs, acutely callous-pointed, about 0.5 mm high, mostly 3–4 mm apart), thin-papery, above deep green, roughish, evenly but sparsely strigillose and short-strigose, beneath brighter green, evenly but sparsely strigillose on veins and surface, tripli- or usually quintuplinerved within 1–2 cm of the base; panicles terminating stem and branches, surpassed by the subtending leaves, strigillose or subappressed-puberulous, somewhat convex, at maturity 6–7 cm wide, the heads at first approximate, at submaturity mostly 2–4 mm apart; heads at submaturity (corollas fallen) depressed-subglobose, 2.5–3 mm high, 4.5 mm thick (moistened); phyllaries 4, broadly ovate to suborbicular, obtuse to very obtuse, ciliate, toward apex sparsely strigillose, the outermost about 5-nerved, the others 9–11-nerved, 2.2–3.5 mm long, 2.5–4 mm wide; pistillate flowers 5–6, all paleate, their pales similar to the inner phyllaries, the corollas (scarcely mature) sparsely hirsutulous at apex, 1.8–2 mm long, the ovaries densely pilose at apex, the achenes obovoid, obcompressed, plump, rounded at base, densely villosulous toward apex, 2.4 mm long, 1.8 mm wide; hermaphrodite flowers 9–11, their pales much narrower than the pistillate and only 1–3-nerved, their corollas white, hispidulous toward apex, 3 mm long, their ovaries 2–2.3 mm long, pilose throughout or glabrous toward base, sometimes bearing near apex a few long gland-tipped hairs.

Colombia: Mountains between Mosoa and Sibundoy, Comisario del Putumayo, 19 May 1935, *W. A. Archer* 3415 (type no. 1,619, 557, U. S. Nat. Herb.).

A member of the section *Trixidium*, nearest *Clibadium terebinthinaceum* (Swartz) DC., in which the branches and branchlets are densely pubescent, the leaves larger, more coarsely serrate, and more densely pubescent beneath, and the heads larger.

Clibadium leiocarpum Steetz var. **strigosum** Blake, var. nov.

Rami petioli foliaque strigosa vel accumbenti-hirsuta.

Costa Rica: On brushy slope, Cerro de Piedra Blanca, above Escasú, Province of San José, 31 January 1924, *P. C. Standley* 32593 (type no. 1,225,816, U. S. Nat. Herb.).

Although this specimen may represent only a chance variation, it differs from other specimens of the species examined in a feature which is usually of considerable significance in the genus, and its separation as a variety seems advisable. The achenes in this specimen are sometimes merely clavellate-puberulous at apex, sometimes also sparsely villous.

Steiractinia lucidula Blake, sp. nov.

Frutex; rami dense strigosi, pilis basi incrassatis; folia magna ovata acuta v. acuminata basi rotundato-cuneata crenato-serrata firme pergamentacea triplinervia subtus reticulata utrinque asperula et lucidula; capitula radiata flava pro genera minuscula per 1-3 apicibus ramorum et ramulorum cymosa paniculam foliosam efformantia, pedunculis pollicaribus; involucri ca. 4-seriati gradati 9-10 mm alti phyllaria oblonga v. oblongo-ovata saepius obtusa exteriora herbacea parum strigosa et ciliata interiora tenuiora apice subscariosa et purpurascens ciliolata; radii 5, ca. 7 mm longi; achenia alata.

Branching shrub 7-10 ft. high; stem (or branch) subterete, solid, pithy, olivaceous, 1 cm thick; leaves opposite; internodes 7-9.5 cm long; petioles stout, unmarginated, densely strigose or strigillose with thickened-base hairs, those of the larger leaves 2-2.5 cm, of the leaves at base of inflorescence about 8 mm long; blades of the larger leaves ovate, about 15-18 cm long, 8-9.5 cm wide, of the leaves at base of inflorescence oblong-ovate, 9.5 cm long, 3.5 cm wide, the larger crenate-serrate from the upper part of the cuneate-rounded base nearly to apex (teeth about 20 pairs, bluntly callous-pointed, 0.5-1 mm high, mostly 5-8 mm apart), about equally green and somewhat shining on both sides, above evenly but not densely strigillose with mostly deciduous hairs with small lepidote-tuberculate persistent bases, beneath rather sparsely strigillose or antrorse-hispidulous especially along the veins and veinlets with slightly tuberculate-based hairs, triplinerved 0.8-2 cm above the base, the chief veins prominulous above, prominent beneath, the others impressed above, whitish and prominulous-reticulate beneath; peduncles in clusters of 1-3 at tips of branches and branchlets and in the upper axils, slender, mostly naked, densely erectish-hirsutulous (the hairs with small blackish tuberculate bases), 2.2-4 cm long, the whole forming a convex leafy-bracted panicle about 28 cm wide; heads about 1.5 cm wide; disk 9-12 mm high, about 7 mm thick in flower, 8-11 mm thick in fruit (as pressed); involucre campanulate, 9-10 mm high, appressed or the outermost phyllaries sometimes loose-tipped, the outermost phyllaries about 5 mm long, 1.8-2.5 mm wide, narrowly oblong or oblong-ovate, thick-herbaceous essentially throughout or pale and indurated at base, obtuse to acutish, rather sparsely strigose or strigillose and short-ciliate, the inner broader (3-3.5 mm), oblong, obtuse or rounded, above subscarios and purplish, erose, ciliate, otherwise nearly or quite glabrous; rays yellow, neutral, sparsely ciliolate at base of limb, otherwise glabrous, the tube 2.5 mm long, the lamina oblong, bluntly 2-3-dentate, 8-9-nerved, papillate on upper surface and margin, 7 mm long, 2.5 mm wide; disk flowers not very numerous, their corollas yellow, glabrous outside, 7.5 mm long (tube 2 mm, throat

funnelform, 5 mm, teeth ovate, strongly recurved, 0.5 mm long, densely papillose and almost hirsutulous inside); pales scarious, obtuse or acutish, usually winged on the keel, ciliolate toward tip and also on the keel, 6.5–8 mm long; ray achenes (immature) inane, trigonous, not winged, erect-hirsute on the angles, about 2.7 mm long, their pappus of about 27 unequal slender hispidulous deciduous awns 1–2.5 mm long; disk achenes cuneate-obovate, compressed, 5 mm long, 3.5 mm wide (including wings), the body mottled gray and brown, erect-pilose chiefly toward apex, 2-winged, the wings thin, olivaceous, ciliate, truncate at apex and there 1 mm wide, the body contracted into a short neck which is widened into the pappiferous disk, the pappus of about 33 slender hispidulous deciduous awns, mostly subequal and about 2.5 mm long.

Colombia: Edge of woods, Mesa de los Santos, Dept. Santander, Eastern Cordillera, alt. 1500 m, 11–15 Dec. 1926, *E. P. Killip & A. C. Smith* 15366 (type no. 1,351,249–50, U. S. Nat. Herb.).

Steiractinia lucidula is most nearly related to *S. schlimii* Blake, also from the Department of Santander (Ocaña), in which the leaves are densely pubescent beneath and not shining, and the outer phyllaries rather densely strigose or accumbent-hirsute, some of them usually equaling the inmost in length.

Helianthella ciliata Blake, sp. nov.

Herba perennis pedalis, caulibus suberectis simplicibus strigoso-hirsutis foliosis monocephalis; folia subuniformia elliptica v. elliptico-obovata v. suprema lineari-lanceolata ca. 4 cm longa 1.2 cm lata obtusa v. acuta basi cuneata subsessilia integra triplinervia margine tuberculato-hispido-ciliata in paginis minute hirsutula; capitulum breviter pedunculatum ca. 4 cm latum; involucri ca. 10 mm alti ca. 3-seriati vix gradati phyllaria lineari-lanceolata acuminata laxa omnino herbacea hispido-ciliata ceterum glabra; radii ca. 11–14 aurei ca. 1.5 cm longi; corollae disci apice purpureae; paleae infra scariosae apice subherbaceae; achenia ciliata et pilosa; pappi exaristati squamellae ca. 6–8 alte laciniato-ciliatae ca. 1.3 mm longae.

Perennial with short caudex; stems few, apparently erectish, somewhat curved, 27–38 cm high, slender, striate, whitish or somewhat purplish-tinged, rather densely or sparsely strigose or substrigose and also usually spreading or ascending-hispid with several-celled white hairs; lower leaves (2–4 pairs) opposite, the others alternate; internodes 3–20 (–28) mm long; lowest leaves much reduced, obovate, about 1 cm long, those just above them elliptic-obovate, 2.5–4.2 cm long, 8–14 mm wide, obtuse, the middle ones elliptic or oblong-elliptic, 3.5–5 cm long, 7–15 mm wide, obtuse to acutish, the upper lance-linear, 2.5–3 cm long, 3–6 mm wide, acute, all light green on both sides, tuberculate-hispid-ciliate, on both sides minutely hirsutulous along the veinlets, sometimes with a few stiff white hairs along costa beneath, 3- or obscurely 5-plinerved from near the base with whitish nerves and finely reticulate, the veinlets somewhat impressed on both sides; peduncle 1–3.5 cm long, pubescent like the stem; involucre 10 mm high, 2 cm wide (as pressed), the phyllaries loosely spreading or perhaps reflexed, 1.2–2 mm wide at base, inconspicuously 3-nerved; disk (as pressed) 1 cm high, 1.2–1.5 cm thick; rays neutral, oval or oval-oblong, rather deeply and irregularly 2–3-toothed (teeth up to 3 mm long), hirsute on tube above and hirsutulous on nerves of back, about 1.5–2 cm long, about 5–9 mm wide, about 12–

nerved; disk corollas purple on the teeth, glabrous except for the densely hirsutulous teeth, 5 mm long (tube 1 mm, throat cylindrical-funneliform, 3 mm, teeth 1 mm long); pales rather soft and thin, scarious below, blackish-green toward the subherbaceous somewhat hooded tip, obtuse, carinate, ciliate on keel above and densely hirsutulous at apex, about 8 mm long; disk achenes (very immature) obovate, flatly compressed, 3 mm long, 1.7 mm wide, narrowly 2-margined, notched at apex, ciliate, pilose on the sides; pappus squamellae about 3-4 on each side of achene, deeply laciniate-ciliate, connate at base, 1-1.3 mm long, equaling or surpassing the long hairs at apex of achene; style branches hispid toward apex, the appendages short, deltoid, merely finely hispidulous, acutish.

Mexico: Majalca, Chihuahua, 6 Sept. 1935, *Harde LeSueur* 156 (type no. 837153, herb. Field Mus.; photog. and fragm., U. S. Nat. Herb.); same locality, 18-20 Aug. 1935, *LeSueur* 157 and 244 (Field Mus.).

Nearest *Helianthella mexicana* A. Gray, of San Luis Potosi and Coahuila. In that species the basal leaves are much longer than the cauline and drawn down into a petiole; the stems are less leafy, with the internodes mostly longer than the leaves; the leaves are more or less hispid on both faces as well as on the margin; and the phyllaries are hispid along the back above as well as on the margin.

Verbesina callilepis Blake, sp. nov.

Herba bipedalis; caulis simplex hispidulus usque ad medium foliatus, supra nudus; folia inferiora (4-juga) opposita obovata obtusa v. acuta basi cuneata sessilia non amplectentia crenato-serrata laete viridia supra scabre tuberculato-hispidula subtus in venis sparse hispidula, superiora 3 alterna multo minora oblanceolata; capitula 3 longe pedunculata medioeria radiata aurea; involucri late campanulati 7 mm alti 3-seriati phyllaria exteriora (2-seriata) subequalia cuneato-obovata v. spathulato-obovata herbacea sub-appressa obtusa v. rotundata subglabra v. in margine et sparse in dorso hispidula, interiora (radios subtendentia) paullo longiora spathulato-obovata rotundata submembranacea saturate viridia aurea-marginata supra erosa: radii 9, ca. 1.2 cm longi; achenia alata glabra epapposa.

Base not seen, but doubtless perennial; stem erect or erectish, slender, 68 cm high (including peduncles), subterete, striate, purplish toward base and there rather densely hispidulous with spreading few-celled hairs, green above and more sparsely hispidulous with shorter hairs, leafy about to middle; principal internodes 4-5 cm long; lowest pair of leaves obovate, 4 cm long, 2 cm wide; next 3 pairs similar but larger, 7.5-8 cm long, 3-3.8 cm wide, apiculate, gradually cuneate-narrowed to the sessile not clasping base, crenate-serrate above the subtire cuneate base (teeth about 9-11 pairs, 3-9 mm apart, under 1 mm high, callous-apiculate), plane, papery, light green with the costa purple-red at base above for half its length, evenly but not densely tuberculate-hispidulous above (the tuberculate bases of the hairs more conspicuous toward the margin), beneath somewhat paler green, smooth to the touch, very sparsely hispidulous on veins, featherveined, the lateral veins about 5-7 pairs, with the veinlets lightly prominulous-reticulate on both sides; upper leaves 3, alternate, remote, 2.3-5 cm long, 7-15 mm wide, oblanceolate, acute, followed by a couple of remote linear-oblanceolate bracts 1 cm long or less; heads 3, about 2.5 cm wide, single on slender terminal and subterminal remote peduncles 3.5-10.5 cm long, the subtending

bracts minute, the peduncles naked, rather densely tuberculate-hispidulous below the heads; outer phyllaries 2–2.2 mm wide, the inner 2.2–2.8 mm wide; rays golden yellow, neutral, the tube hispidulous, 1.2 mm long, the lamina oval, 3-denticulate, sparsely hispidulous toward base below, 9-nerved; disk corollas (immature) golden, sparsely hispidulous on the short tube, 3.3 mm long; pales (immature) acute, sparsely hispidulous, with broad scariosus margin below, above blackish green with golden yellow erect tip and margin; disk achenes (very immature) subquadrate-obovate, 1.7 mm long, 1.2 mm wide, narrowly winged, essentially glabrous, epappose.

Mexico: Infrequently scattered on tolerant pine slopes, Transition Zone, Los Cascarones, Rio Mayo, Chihuahua, 11 Sept. 1936, *H. S. Gentry* 2682 (type no. 862339, Field Museum; photograph and fragments, U. S. Nat. Herb.).

A species of the Section *Pterophyton*, nearest *Verbesina mixtecana* Brandeg. of Oaxaca. In *V. mixtecana* the stem is stipitate-glandular as well as spreading-hispid, the lowest leaves are narrowed into a petioliform base half as long as the blade, the leaf blades are smaller and much more densely pubescent with longer more or less spreading hairs, and the phyllaries are narrow, lance-oblong, and acute or subacuminate.

Coreopsis integra Blake, sp. nov.

Frutex dichotomus glaber, pedunculis et involucribus subtomentoso-pilosis exceptis; folia opposita lineari-filiformia integra acuta sessilia 1.7–3 cm longa 0.5–0.8 mm lata; capitula mediocria solitaria pedunculata radiata aurea; involucri flavescenti-tomentoso-pilosi phyllaria exteriora 7–8 oblonga obtusa 4–5 mm longa, interiora 8 oblonga 9–10 mm longa; achenia longe ciliata in ventre dense pilosa in dorso subglabra; pappi aristae 2 dense antrorsim pilosae.

Shrub, 0.6 m high; stem and branches subterete, grayish brown, glabrous; branchlets greenish, striate, slender, glabrous; internodes 0.3–5 cm long, usually 1.5–4 cm; leaves acutely subulate-tipped, connate at base into a glabrous sheath 1 mm high, coriaceous, subterete in cross-section, above obscurely flattened, 1- or 3-sulcate, sordidly pilosulous along the impressed costa, beneath glabrous, rounded, (in the dried state more or less 1-sulcate), erect or ascending, light green, often with axillary fascicles; peduncles 1 or 2 at tips of branches, monocephalous, slender, pilose-subtomentose especially toward apex with flavescent hairs, naked or few-bracted, 2.3–3.2 cm long; heads 3–3.5 cm wide; disk 8–(fruit) 11 mm high, about 1 cm thick; involucre 2-seriate, 9–10 mm high, densely and flavescently subtomentose-pilose on the exposed surface of the phyllaries, the outer 1-seriate, 7–8, herbaceous, oblong, 4–5 mm long, 1.3–1.8 mm wide, obtuse, obscurely apiculate, 3-nerved, glabrescent above outside, inside densely stipitate-glandular and toward apex pilosulous, the inner 8, thick-membranous, oblong or oval-oblong, 3–4 mm wide, obtusely pointed, very many-nerved, deep brown, narrowly yellow-margined, glabrous or glabrate on margin, pilosulous toward apex inside; rays 8, neutral, golden yellow, the tube puberulous, 2.5 mm long, the lamina oval, 11-nerved, weakly 3-denticulate, 16 mm long, 6–8 mm wide; disk corollas golden yellow throughout, puberulous on upper part of tube, 5.8 mm long (tube 2 mm, throat funnelform, 2.8 mm long, teeth ovate, 1 mm); pales linear-lanceolate, 7 mm long, acuminate, about 5-nerved, pilose-ciliate, pilose dorsally; ray achenes (inane) linear, pilose-ciliate, gla-

brous on outer face, glabrous or pilose along midline on inner; disk achenes obcompressed, linear-oblong or linear-obovate, 4.8 mm long, 1.3 mm wide, blackish brown, densely long-pilose-ciliate on margins and at apex, on outer face glabrous or pilose toward margin, on inner face densely long-pilose; awns 2, densely upward-pilose, 2.8 mm long; style tips short-deltoid, hispidulous, apiculate.

Peru: On rocky eastern slope at San Carlos Mines, 6 miles west of Hualanca, Dept. Huánuco, alt. about 2745 meters (9000 ft.), 30 Sept. 1922, *J. F. Macbride & W. Featherstone* 2469 (type no. 518895, herb. Field Mus.; dupl. no. 1,198,895, U. S. Nat. Herb.).

Nearest *Coreopsis longula* Blake, from Chachapoyas, Peru, which has much longer and obtuse leaves, smaller heads (usually in 2's or 3's), much less pubescent involucre, and lance-subulate outer phyllaries.

Coreopsis sherffii Blake, sp. nov.

Frutex trichotome ramosus, ramis hexagonis glabratis, ramulis bifariam pilosulis; folia opposita internodiis saepius breviora ca. 2 cm longa, petiolo anguste cuneato-marginato ciliato, lamina ambitu deltoidea tripartita coriacea, lobis saepius anguste cuneatis 2-4 mm latis apice acute 2-3-dentatis, interdum oblongis v. oblongo-lanceolatis integris acutis; capitula mediocria usque ad 3 cm lata radiata aurea modice pedunculata in apicibus caulis et ramorum solitaria v. 3-5 cymosa; involucri glaberrimi v. solum basi ima pilosi phyllaria exteriora 8 crasse herbacea paullum obovato-oblonga obtusa v. acute apiculata 3.5-4.5 mm longa 1-2 mm lata, interiora duplo longiora membranacea oblonga rotundata saturate brunnea anguste aureo-marginata; achenia dense ciliata in ventre pilosa in dorso glabra; pappi aristae lanceolatae antrorsim pilosae.

Shrub ca. 7.5 dm high; stem subterete, striate, gray-barked, glabrous, 4 mm thick; branches of the year light brown, slender, hexagonal, pilosulous in 2 grooves, otherwise glabrous; internodes of branches mostly 2.5-4.5 cm. long, much exceeding the leaves, of the branchlets mostly 0.5-2 cm long and surpassed by the leaves; petioles very narrowly cuneate-margined to base, 5-11 mm long, pilose-ciliate with jointed hairs especially toward base, usually with fascicles in their axils, connate at base for 1-1.5 mm; blades deltoid in outline, 6-10 mm long, 6-12 mm wide, cuneate at base, 3-parted, the lobes mostly 4-7 mm long, 2-4 mm wide, plane, light green, the lateral usually acutely 2-toothed at apex, the terminal 3-toothed or 3-fid, sparsely short-pilose along costa above or usually glabrous; leaves of the branchlets mostly smaller and merely 3-fid, with linear-oblong or oblong-lanceolate entire acutely subulate-pointed lobes; peduncles 1-headed, densely spreading-pilose with flavescent hairs, 1-2.3 cm long; heads (as pressed) 2.7-3 cm wide; disk about 6-8 mm high, 7-10 mm thick (as pressed); involucre double, the outer phyllaries essentially 1-seriate, more or less obovate-oblong, appressed, pale green with 3 black vittae, the inner about the same number, 7-9 mm long, 3.5-4 mm wide, minutely erose ciliate at the broadly rounded apex, densely brown-lineate; rays 8, neutral, golden yellow, subglabrous, the tube 1-1.5 mm long, the lamina broadly oval, shortly and bluntly about 3-4-dentate, 11-nerved, 11-14 mm long, about 7 mm wide; disk corollas golden yellow, glabrous, 4-4.5 mm long (tube 1.5 mm, throat campanulate or funnelform-campanulate, about 2 mm, teeth broadly ovate, 0.8 mm long); pales in flower oblong-obovate, obtuse, sometimes emarginate, about 4 mm long, short-ciliate toward apex,

erect-pilose on middle of back, 5-7-vittate; ray achenes inane, oblong, sparsely short-ciliate above, glabrous on the faces, epappose, 2 mm long; disk achenes (submature) narrowly obovate-oblong, 4.5 mm long, 1.5 mm wide, densely long-ciliate, sparsely erect-pilose in middle on inner face, glabrous on outer, their pappus of 2 lanceolate basally antrorse-pilose, apically hispidulous awns 1.8 mm long; style branches with deltoid acute not penicillate-tufted hispidulous appendages.

Peru: Small neat very erect (2.5 ft.) clumps on steep grassy slopes, Chinchapalca, 6 miles above Mito, Dept. Huánuco, alt. about 2900 m (9500 ft.), 16-27 July 1922, *J. F. Macbride & W. Featherstone* 1596 (type no. 518100, herb. Field Mus.; dupl. no. 1,198,886, U. S. Nat. Herb.); in half-hanging ragged clumps on steep sunny slopes, with very brittle stems, Mito, Dept. Huánuco, alt. about 2745 m (9000 ft.), 8-22 July 1922, *Macbride & Featherstone* 1482 (Field Mus., U. S. Nat. Herb.).

This fine species, distinguished from most of its allies by the cutting of its foliage, appears to be nearest *Coreopsis microlepis* Blake & Sherff, from the Province of Chachapoyas, Peru. In that plant the upper leaves are very greatly reduced, so that the heads appear to be rather numerous in an essentially naked panicle; the leaves, although sometimes rather closely similar to those of *C. sherffii*, usually have the terminal segment of the ternately parted leaf so deeply 3-lobed as to give the appearance of a pinately 5-lobed leaf; the heads are smaller; and the outer phyllaries are ovate or oblong-ovate, only 1.5-2 mm long, 0.6-0.8 mm wide. The dried heads of *C. sherffii* impart a deep orange color to the water in which they are boiled. The species is dedicated to my friend Dr. Earl E. Sherff, whose quarter century of botanical activity, devoted primarily to the study of the Coreopsidinae, has resulted in revisions of the genera *Coreopsis*, *Bidens* (in press), *Isostigma*, *Cosmos*, *Tetramolopium*, *Lipochaeta*, *Dubautia*, and *Railiardia*, and in papers on various other groups of plants.

***Calea marginata* Blake, nom. nov.**

Meyeria longifolia DC. Prodr. 5: 671. 1836.

Calea longifolia Baker in Mart. Fl. Bras. 6³: 260. 1884. Not *C. longifolia* Gardn. 1848.

The name *longifolia* is not available for this species, having been used by Gardner for a species described from Goyaz. The new name assigned refers to the conspicuous thickened margins of the leaves.

***Vasquezia oppositifolia* (Lag.) Blake.**

Villanova oppositifolia Lag. Nov. Gen. & Sp. 31. 1816.

***Vasquezia titicacensis* (Meyen & Walp.) Blake.**

Wedelia titicacensis Meyen & Walp. Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 19: Suppl. 1: 269. 1843.

Villanova titicacensis Walp. Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 19: Suppl. 1: 206. 1843.

The name *Villanova* Lag. (1816) being preoccupied by *Villanova* Orteg.